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(54) **LAUNDRY TREATMENT DEVICE WITH DOOR ASSEMBLY**

WÄSCHEBEHANDLUNGSVORRICHTUNG MIT TÜRANORDNUNG

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**EP-A2- 1 486 604 WO-A1-93/23601
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Description

Field of the invention

[0001] The present invention relates to a laundry treatment device, in particular to a washing machine, a dryer or a washer/dryer, i.e. a washing machine having also dryer functions, comprising a door assembly provided with a locking device for locking the door assembly in a closed position. The locking device is unlocked by means of a handle pivotally supported on the door assembly.

Background of the invention

[0002] Conventionally, laundry treatment devices include a casing within which a laundry treatment chamber, typically formed by a drum, is located. In the casing, an opening is formed, allowing the user to have access to the treatment chamber in order to load or unload the laundry before and after the washing and/or drying cycle(s). In order to close the treatment chamber, laundry treatment devices further comprises a door assembly, pivotally supported on the casing (see, for example WO 93/23601).

[0003] Laundry treatment devices are also provided with a locking device for keeping the door assembly locked and consequently closing the drum during washing and/or drying cycle(s). Typically, such locking devices comprise a latch, supported on the door assembly, engaging a respective hole provided in the casing when the door is urged in its closed position.

[0004] The latch is normally provided with a spring element forcing the latch in the engaged position when the door is closed.

[0005] The latch can be operated by means of a handle disengaging the latch when it is rotated.

[0006] An example of this second known solution is disclosed in EP 2038470, related to a laundry care appliance, comprising a door with an opening element, in form of a handle, and a latch device. The latch device has a displaceable latch bolt which is mechanically coupled to the opening element in such a way that the latch bolt can be displaced by actuating the handle.

[0007] According to a first embodiment, the handle is positioned above a front surface of the door frame. The frame is provided with a passage through which a portion of the handle passes in order to engage the latch bolt and thus operate it for unlocking the door. The handle is rotatable in such a way that a grip portion of the handle is brought from the periphery of the door towards a central part thereof.

[0008] The main drawbacks of this solution are represented by the fact that in order to rotate the handle in the sense above described it is necessary to apply a force on the handle, and thus on the door, which opposes to the opening movement of the door. Accordingly an unnatural movement is required in order to unlock and open the door of the appliance. This drawback is even in-

creased by the fact that the handle is rotatable about an axis tilted to the axis of the door, since this feature requires placing the handle closer to the door hinge.

[0009] Furthermore, in order to grip the handle a gap large enough to let the passage of the fingers is defined between the handle and frame of the door. A handle remarkably projecting from the frame is both unpleasant aesthetically and easily subjected to breakages.

[0010] According to second embodiment of EP 2038470, the handle projects radially from the periphery of the door frame. To this purpose, a recess, inside which the handle is partially housed and from which a grip portion thereof projects, is defined in the frame.

[0011] In order to make the grip portion easily reachable by the hand of the user it is required to provide the handle with a relatively long arm.

[0012] Therefore, also in this case the appliance is subjected to the drawbacks of being unpleasant aesthetically and subjected to breakages.

[0013] A second drawback of the second embodiment of EP 2038470 is represented by the fact that a gap is defined between the handle and the frame.

[0014] Since also in this case the handle rotates in the same direction of the first embodiment, the user can pinch their fingers in the gap when rotating the handle.

[0015] A solution similar to this second embodiment of EP 2038470 is also disclosed in EP 1213415 .

[0016] EP 1564323 to LG Electronics Inc. discloses a washing machine having a door wherein the handle is positioned below the surface of the door frame.

[0017] The handle is completely covered by the frame and accordingly its position is not visually well evident to the user.

[0018] Moreover, in order to house the handle a hole is defined between the frame and a counter-frame of the door. Nevertheless, since only a limited space is available between the frame and the counter-frame, a flat handle and of relatively small dimensions should be used.

[0019] Therefore, the solution of EP 1564323 is not suitable for using an ergonomic handle which can be easily reached by the hand of the user.

[0020] A similar solution is also disclosed in EP2184395.

[0021] As a further alternative GB 2081858 discloses a tumbler drier comprising a door with a hinge and a handle having a latch cooperating with a catch plate fixed on the cabinet of the tumbler.

[0022] In a door frame an opening is defined in order to house the handle, which is flush with an outer surface of the frame.

[0023] In order to operate the latch the handle is rotatable from the internal part of the door towards outside and it is required that a gap is defined between the handle and the door frame.

[0024] Therefore, also in this case the user can pinch their fingers on the gap when rotating the handle.

[0025] Furthermore, in order to maintain good aesthetic properties, it is required to use a flat handle extending

at least through the whole width of the frame.

[0026] This again entails the drawback of not being ergonomic and to be easily subjected to breakages.

[0027] WO2007110442 discloses a similar solution to the latter, as well as, in a second embodiment, an handle with similar features but housed in a recess that does not extend through the whole width of the frame. Even this second embodiment is subjected to the same drawback of GB 2081858 in particular to the risk of pinching the fingers during the opening of the door.

Summary of the invention

[0028] The aim of the invention is to provide a laundry treatment device which door handle is strong, enduring, and ergonomic.

[0029] An object of the invention is to provide a laundry treatment device that overcomes the drawbacks of known laundry appliances with rotatable handles.

[0030] A further object is to provide a laundry treatment device the aesthetical appearance of which is improved and in which the presence of the handle does not impair the appearance of the door and/or of the frame thereof.

[0031] Furthermore, it is also an object of the present invention to provide a laundry treating machine wherein the user is not subjected to the risk of pinching his fingers when rotating the handle.

[0032] A still further object is to provide a laundry treatment device using an handle rotating in a versus promoting the opening of the door with a compact, strong and simple structure.

[0033] According to the invention it is provided a laundry treatment device comprising:

- a casing supporting a treatment chamber for receiving laundry to be treated, the casing including an aperture for granting access to the treatment chamber;
- a door assembly pivotally mounted on the casing and capable of opening and closing the aperture;
- a locking device for locking the door assembly in a closed position in which the aperture is closed;
- wherein the door assembly comprises:
 - a door frame supporting the locking device and in which a recess is defined; and
 - a handle which is:
 - partially housed in the recess;
 - pivotally supported on the door frame and capable of performing a rotation between a resting position in which the handle operates the locking device so as to lock the door assembly and an unlocking position in which the handle operates the locking device so as to unlock the door assembly;
 - the handle further comprising:

- a grip portion facing an internal region of the door assembly; and
- a flap opposed to the grip portion and overlapping a surface of the door frame adjacent to the recess both in the resting and in the locking position of the handle;

the rotation being obtained by pulling the grip surface away from the door assembly.

[0034] It is to be understood that the in the laundry treatment device according to the invention the structure of the handle is such that the force exerted in order to rotate the grip portion comprises at least a component directed in the opening direction of the door assembly, thus allowing an easier access to the treatment chamber.

[0035] The flap and its position relative to the grip portion allow protecting the area of the frame in which a user may pinch their fingers.

[0036] Also, the handle is advantageously at least partially in the recess of the door frame, which, together with the rotation of the handle and the presence of the flap, makes it possible to avoid the use of elements excessively projecting from the door frame, thus reducing the overall external dimensions of the machine and improving the aesthetical appearance of the device.

[0037] According to a preferred embodiment, in the laundry treatment device according to the present invention the door frame and the flap are shaped such that a gap between the surface adjacent to the recess and an edge of the flap both in the resting position and in the unlocking position of the handle. Preferably, the gap defined in the unlocking position is greater or equal to the gap defined in the resting position.

[0038] This advantageously avoids any risk of pinching the fingers during the rotation of the handle.

[0039] Preferably, the handle comprises a main body at least partially housed in the recess of the frame and from which the flap projects, thus improving the robustness of the handle.

[0040] According to a further preferred aspect, the handle is rotatable about a pin supported on the door frame. The main body is cantilevered from the pin and it is pivotally connected to the pin by at least one connecting arm. At least one aperture is also defined in the recess for allowing the passage of the connecting arm. It will be appreciated that in this way the structure of the handle is remarkably simple and compact.

[0041] Preferably, it is defined in the handle a cavity, which comprises the grip portion and it is placed in a position opposed to the flap, thus improving the ergonomics of the handle since it allows to insert the fingers inside it even with a compact and simple structure.

[0042] According to another aspect of the invention, the rotation of the handle is limited by the contact of the main body with a side wall of the recess.

[0043] This advantageously allows providing the handle with a stop without any risk of pinching the fingers.

[0044] Always according to a preferred embodiment, the locking device comprises a latch, suitable for engaging in a respective hole provided in the casing, the latch being engaged in the hole in the locking position and disengaged in the unlocking position. Preferably, the latch is pivotally supported on the door frame and it is switched between the locking position and the unlocking position through a rotation thereof which is preferably obtained by means of the rotation of the handle.

[0045] This structure allows obtaining a reliable locking of the door in a simple manner.

[0046] According to another preferred aspect of the invention, the handle and the latch are rotatable about the same axis which is preferably substantially parallel to an axis of rotation of the door assembly relative to the casing. In this manner it is possible to maximize the arm of the force applied on the door by pulling the handle.

[0047] Preferably, the handle is connected to the latch by means of a resilient connector, so that a force feed-back is applied to the handle when unlocking the latch, thus avoiding the risk of applying an excessive force on the handle.

[0048] According to another embodiment, the locking device comprises a resilient element biasing the latch into said locking position.

[0049] Still according to a further aspect of the invention, the edge of the flap travels in the rotation of the handle along a path which does not intersect the surface of the door frame overlapped by the flap. Also, preferably, the gap between the edge and the surface adjacent to the recess is smaller than a finger thickness. These aspects also contribute in avoiding any risk of pinching the fingers when rotating the handle.

Brief description of the drawings

[0050] These and other features and advantages of the invention will be better apparent from the following description of some exemplary and non-limitative embodiments, to be read with reference to the attached drawings, wherein:

- Fig. 1A is a front view, with a door assembly in an open configuration, of a laundry treatment device according to the present invention;
- Fig. 1B is a front view of the laundry treatment device of fig. 1A with the door assembly in a closed configuration;
- Fig. 2 is a perspective view of the door assembly of the laundry treatment device of Figs. 1A and 1B;
- Fig. 3 is an exploded perspective view of the door assembly of Fig. 2 and of a front face of a casing of the laundry treatment device onto which the door assembly is supported;

- Figs. 4A and 4B are sectional lateral views of the door assembly and of the casing of Fig. 3, with an handle of the door assembly in a resting position and in an unlocking position, respectively;

- Figs. 5A and 5B are a perspective and a front view, respectively, of the door assembly with the handle in the resting position;

- Figs. 6A and 6B are a perspective and a front view, respectively, of the door assembly with the handle in the unlocking position;

- Fig. 7 is an exploded perspective view, in an enlarge scale, of the handle and of a locking device details of the door assembly according to the present invention;

- Fig. 8 is a perspective enlarged view of the handle and the locking device of Fig. 7, when assembled; and

- Figs. 9A and 9B are a perspective and a respective detail of the handle and the locking device mounted on a counter-frame of the door assembly according to the present invention.

Detailed description of the invention

[0051] With reference initially to Figs. 1A and 1B, a laundry treatment device realized according to the present invention is globally indicated with the reference number 100.

[0052] It should be noted that in the context of the present invention with the term laundry treatment device it is to be intended any type of appliance suitable for the treatment of laundry, such as washing machines, tumble-dryers or washer/dryers, i.e. a washing machines having also dryer functions.

[0053] The laundry treatment device 100 comprises an outer casing 101, preferably but not necessarily parallelepiped-shaped, and a treatment chamber, such as a drum 102, for example having the shape of a hollow cylinder, for housing the laundry and in general the clothes and garments to be washed and/or dried. The drum 102 is preferably rotatably associated to the casing, so that it can rotate around an axis thereof. According to the present embodiment, the rotation axis of the drum 102 is substantially horizontal but it should be appreciated that, as an alternative, the drum can be positioned in the casing 101 in such a position that its rotation axis is tilted.

[0054] An aperture 101a is defined in the casing, facing the treatment chamber and thus granting access to the drum for loading and unloading the laundry in the device. The laundry treatment device 100 further comprises a door assembly 1 pivotally supported on the casing 101 and displaceable between an open position, in which access to the drum is granted, and a closed position, in

which the aperture 101a is closed or preferably sealed.

[0055] According to the present embodiment, the aperture 101a is defined in a front face of the casing 101; preferably, the device 100 comprises a control panel 103 placed in the front face of the casing 101. Advantageously the device 100 comprises a drawer 104 suitable, if device 100 is a washing machine or washer-drier, for containing detergents and other additives, and if the device 100 is a drier, for collecting water.

[0056] Always with reference to Fig. 1, the laundry treatment device 100 further comprises a locking device 3 for locking the door assembly 1 in the closed position in which the aperture 101a is closed. According to a preferred embodiment, and as will be better shown in the following, the locking device comprises a latch 3 suitable for engaging in a respective hole 30 provided in said casing 101 in a position adjacent to the aperture 101a. The latch 3 is advantageously hook-shaped and it is engaged in the hole 30 in a locking position of the locking device, thus avoiding the opening of the door assembly 1, and disengaged from the hole 30 in a unlocking position in which the door assembly is free to rotate about an axis Z on which the door assembly is hinged.

[0057] With reference now also to Figs. 2 and 3, the door assembly 1 comprises a door frame 10 supporting the latch 3 and, more in general, the locking device. A handle 2 operating the locking device is also supported on the door frame 10, operatively connected to the locking device 3. Preferably, as will be also described in further detail in the following, the latch 3 is pivotally supported on the door frame 10 and it is switched between the locking position and the unlocking position through a rotation thereof.

[0058] According to the present embodiment, the door assembly 1 further comprises a screen 15, preferably made of glass, allowing visual access to the treatment chamber when the door assembly 1 is closed. The screen 15 is supported internally on the door frame 10, defining an internal region thereof. The door assembly 1 preferably further comprises a counter-frame 12 coupled to the frame 10 and between which an edge 15a of the screen 15 is advantageously clamped. Advantageously, the frame 10 and the counter-frame 12 are fixed the one to the other, preferably by means of a snap connection, more preferably combined with screws, not shown in the Figures.

[0059] Preferably, the counter-frame 12 is formed by a honeycomb structure, thus improving the robustness of the door assembly.

[0060] According to alternative embodiments, not illustrated in the Figures, the door assembly 1 could be formed as a single piece, for example when visual access to the treatment chamber 102 is not required. In these cases, the door frame could be preferably disk-shaped instead of being annular shaped as in the previous embodiment.

[0061] It should be also noted that in the previous embodiments the door assembly 1 and the frame 10 are

substantially circular, but even different shapes could be envisaged.

[0062] With reference again to Figs. 2 and 3, the door assembly 1 is supported pivotally on the casing 101 by means of a hinge, preferably comprising a support plate 6, and a pin 60, onto which the door frame 10 is hinged about the axis Z. As shown in Fig. 3, the pin 60 is preferably clamped between the counter-frame 12 and the frame 10 and it is preferably locked by means of locking heads 61 positioned at the opposed ends of the pin 60.

[0063] As shown in Fig. 3, a recess 11 is defined in the door frame 10 in which the handle 2 is partially housed. According to a preferred embodiment, the recess 11 faces an internal region of the door assembly 1 that, in the present embodiment, corresponds to the screen 15.

[0064] Advantageously, the recess 11 does not spread to the entire width of the door frame 10; advantageously a surface 10a of the frame is defined around the recess 11. In the present embodiment, the surface 10a advantageously faces frontally the laundry treatment device 100, i.e. a user will face the surface 10a when operating the device 100.

[0065] As it will be better apparent in the following, this position of the recess 11 makes it possible to house the handle 2 in the door frame 10 without excessively projecting from the periphery thereof, which helps reducing the overall external dimensions of the machine.

[0066] The handle 2 is pivotally supported on the door frame 10 around an axis A and it is capable of performing a rotation α (see for example Fig. 2) between a resting position and an unlocking position. In the resting position, which is shown in Figs. 4A, 5A and 5B, the handle 2 operates the locking device 3 so as to lock the door assembly 1. As shown in Fig. 4A, in the resting position a hook portion 31 of the latch 3 engages the hole 30 of the casing 101, thus locking the door assembly in the closed position. According to a preferred embodiment, the rotation of the latch 3 between the locking and the unlocking position is obtained by the rotation α of the handle 2. The connection between the latch 3 and the handle 2 in order to couple their rotation and operate the former will be described in detail in the following.

[0067] In the unlocking position, shown in Figs. 4B, 6A, 6B, the handle 2 operates the locking device 3 so as to unlock said door assembly 1 by disengaging the hook 31 from hole 30 and consequently allowing the rotation of the door assembly about axis Z.

[0068] Always with reference to Fig. 4A and 4B, the handle 2 comprises a grip portion 21 facing the screen 15 or, more in general, the internal region of the door assembly 1.

[0069] Opposite to the grip portion 21, the handle further comprises a flap 23 that, as apparent from the Figures, overlaps the surface 10a adjacent to the recess 11 of the door frame 10 both in the resting and in the locking position of the handle 2. In this manner the gap between the handle and the recess 11 is covered frontally by the flap 23 in any position of the handle 2. In other words,

this avoid the possibility of putting a finger in a potentially hazardous gap defined between the recess 11 and the handle 2, since, as clearly shown in Fig. 4B, said gap narrows when the handle 2 is rotated.

[0070] Preferably, in order to avoid any risk of pinching one's finger, door frame 10 and flap 23 are shaped such that a further gap is defined between the surface 10a and an edge 23a of the flap 23 both in the resting position and in the unlocking position of the handle 2. More preferably, the gap defined in the unlocking position is greater or equal to the gap defined in the resting position.

[0071] In this manner, even if a finger is placed in the gap when opening the handle 2, there will be no risk of pinching it.

[0072] Always according to a preferred embodiment, the gap between the edge 23a and the surface 10a adjacent to the recess 11 is smaller than a finger thickness both in the resting position and in the unlocking position of the handle 2.

[0073] It should be also noted that, advantageously, the edge 23a of the flap 23 travels in the rotation α of the handle 2 along a path without abutting against the surface 10a adjacent to the recess 11.

[0074] This means that the flap 23 does not enter into contact with the door frame 10 when the handle is rotated to its maximum extent.

[0075] Advantageously, the handle 2 comprises a main body 20 suitable for being at least partially housed in the recess 11 and from which the flap 23 projects.

[0076] In this way, the rotation α can be advantageously limited by the contact of the main body 20 with a side wall 13 of the recess 11, acting as a stop surface. Since the rotation of the handle 2 is stopped by the contact of these relatively wide surfaces, excessive stresses on the components of the handle 2, and in general of the door assembly 1, can be advantageously avoided even if it is further pulled. This improves the endurance of the door handle and of the door assembly.

[0077] Always according to a preferred embodiment, a cavity 24 is also defined in the main body 20 of the handle 2. The cavity 24 is opposed to the flap 23 and the grip portion 21 is defined by an internal surface of the cavity 24.

[0078] In this manner, the rotation α of the handle 2 can be easily obtained by pulling the grip portion 21 away from the door assembly 1, as shown by an arrow in Fig. 4B.

[0079] Always according to Fig. 4B, when the grip portion 21 is pulled, and consequently the handle 2 is rotated, the latch 3 is also rotated accordingly, thus disengaging it from hole 30.

[0080] Advantageously, the position of the grip portion 21 together with the direction of the rotation α of the handle 2 promotes the opening of the door assembly, as pointed out by the arrows in Fig. 4B.

[0081] The provision of the cavity 24 in the main body 20 of the handle 2 is also advantageous since the user can easily reach the grip portion 21 by putting his fingers

therein. Also, it should be appreciated that since the main body 20 is housed in the recess 11, it is not required that the handle 2 projects excessively from the door frame 2 in order to provide an ergonomic grip to the user.

[0082] As also shown in Fig. 2, in order to maximize the torque applied, the door 2 is hinged on a position diametrically opposed to the handle 2 and, consequently, to the grip portion 21. Preferably, the axis A of the handle 2 is substantially parallel to the axis of rotation Z of the door assembly 1 relative to said casing 101. In this way, the pulling force on the grip portion 21 is maximally effective in opening the door assembly 2.

[0083] Always according to a preferred embodiment, the handle 2 is rotatable about a pin 5, defining the axis A and supported on the door frame 10 or on the counter-frame. The main body 20 is cantilevered from the pin 5 and it is pivotally connected to this pin 5 by at least one connecting arm 25 passing through a respective aperture 14 defined in the recess 11, as shown in Fig. 4A.

[0084] In this manner, flap 23 is separated from pin 5 by the surface 10a, thus effectively protecting the locking device. Furthermore, since the flap 23 projects from the main body 20 which is in turn cantilevered from the pin 5, it is possible to protect any potentially hazardous gap with a compact structure.

[0085] Preferably, with reference to Figs. 7 and 8, the handle 2 comprises a pair of connecting arms 25, each arm 25 being provided with a respective hole 26, into which the pin 5 is inserted. Between arms 25 a region is defined into which the latch 3 is housed.

[0086] Preferably, the latch 3 comprises an end portion 32, opposed to the hook 31 engaging in the hole 30, in which an aperture 32a is defined for pivotally supporting the latch on the pin 5. In this way, the handle 2 and the latch 3 are rotatable about the same axis A.

[0087] In order to couple the rotation of the handle 2 and the latch 3 the locking device comprises a resilient connector 4. As shown in Figs. 7, 8 and 9A, the resilient connector 4 comprises a pair of arms 42 connected by respective windings 41 to a central portion 40 projecting in opposite direction relative thereto.

[0088] Arms 42 rests on a resting surface 27 of the handle 2, while the central portion 40 surrounds the latch 3.

[0089] Windings 41 are concentric to axis A and, when arms 42 are rotated around said axis, a corresponding rotation is provided to the central portion 40. Accordingly, a rotation of the handle 2 is resiliently transmitted to the latch 3 for the presence of the windings 41.

[0090] It will be anyhow appreciated that the rotation of the handle 2 could be transmitted to the latch 3 in order to disengage it also in different manner and the handle 2 and the latch 3 can also be made as a single piece.

[0091] Always according to the present embodiment, the locking device further comprises a resilient element 33 biasing said latch 3 into the locking position. Analogously to the resilient connector 4, the resilient element 33 comprises a pair of arms 35 connected by respective

windings 34 to a central portion 36 projecting in opposite direction relative thereto.

[0092] As shown in Fig. 8, the latch 3 is clamped between the central portion 36 of the resilient element 33 and the central portion 40 of the resilient connector 4. In other words, the rotation of the latch 3 is hindered in both directions. With reference then to Fig. 9A, arms 35 of the resilient element 33 rest on respective projections 16 formed on the counter-frame 12. This makes it possible to hold the resilient element 33 simply by clamping the frame 10 and the counter frame 12 together.

[0093] It should also be appreciated that the provision of the resilient element 33 advantageously permits that, when the door assembly is closed, the latch 3 is forced in its locking position and the door assembly can be opened only if the locking device is operated by the handle 2.

Claims

1. A laundry treatment device (100) comprising:

- a casing (101) supporting a treatment chamber (102) for receiving laundry to be treated, said casing including an aperture (101a) for granting access to said treatment chamber (102);
- a door assembly (1) pivotally mounted on said casing (101) and capable of opening and closing said aperture (101a);
- a locking device (3) for locking said door assembly in a closed position in which said aperture (101a) is closed;
- wherein said door assembly (1) comprises:
 - a door frame (10) supporting said locking device (3) and in which a recess (11) is defined; and
 - a handle (2) which is:
 - partially housed in said recess (11);
 - pivotally supported on said door frame (10) and capable of performing a rotation (α) between a resting position in which said handle (2) operates said locking device (3) so as to lock the door assembly (1) and an unlocking position in which said handle (2) operates said locking device (3) so as to unlock said door assembly (1);

characterizes in that said handle (2) further comprises:

- a grip portion (21) facing an internal region (15) of said door assembly (1); and
- a flap (23) opposed to said grip por-

tion (21) and overlapping a surface (10a) of said door frame (10) adjacent to said recess (11) both in the resting and in the locking position of said handle (2);

said rotation (α) being obtained by pulling said grip portion (21) away from said door assembly (1).

2. The laundry treatment device (100) according to claim 1, wherein said door frame (10) and said flap (23) are shaped such that a gap between said surface (10a) and an edge (23a) of said flap (23) is defined both in said resting position and in said unlocking position of said handle (2), the gap defined in said unlocking position being greater or equal to the gap defined in said resting position.

3. The laundry treatment device (100) according to claim 1 or 2, wherein said handle (2) comprises a main body (20) suitable for being at least partially housed in said recess (11) and from which said flap (23) projects.

4. The laundry treatment device (100) according to claim 3, wherein said handle (2) is rotatable about a pin (5) supported on said door frame (10), said main body (20) being cantilevered from said pin (5) and being pivotally connected to said pin (5) by at least one connecting arm (25) and wherein at least one aperture (14) is defined in said recess (11) through which said connecting arm (25) passes.

5. The laundry treatment device (100) according to claim 3 or 4, wherein a cavity (24) is defined in said handle, said cavity (24) being opposed to said flap (23) and comprising said grip portion (21).

6. The laundry treatment device (100) according to any of claims 3 to 5, wherein said rotation (α) is limited by the contact of said main body (20) with a side wall (13) of said recess (11).

7. The laundry treatment device (100) according to any of the preceding claims, wherein said locking device comprises a latch (3), suitable for engaging in a respective hole (30) provided in said casing (101), the latch (3) being engaged in said hole (30) in said locking position and disengaged in said unlocking position.

8. The laundry treatment device (100) according to claim 7, wherein said latch (3) is pivotally supported on said door frame (10) and is switched between said locking position and said unlocking position through a rotation thereof.

9. The laundry treatment device (100) according to

claim 8, wherein said latch (3) is rotated by means of said rotation (α) of said handle (2).

10. The laundry treatment device (100) according to claim 9, wherein said handle (2) and said latch (3) are rotatable about a same axis (A). 5
11. The laundry treatment device (100) according to claim 10, wherein said axis (A) is substantially parallel to an axis of rotation (Z) of said door assembly (1) relative to said casing (101). 10
12. The laundry treatment device (100) according to any of claims 7 to 11, wherein said handle (2) is connected to said latch (3) by means of a resilient connector (4). 15
13. The laundry treatment device (100) according to any of claims 7 to 12, wherein said locking device comprises a resilient element (33) biasing said latch (3) into said locking position. 20
14. The laundry treatment device (100) according to any of claims 2 to 13, wherein said edge (23a) of said flap (23) travels in said rotation (α) of said handle along a path without intersecting said surface (10a) of said door frame (10) overlapped by said flap (23). 25
15. The laundry treatment device (100) according to any of claims 2 to 14, wherein said gap between said edge (23a) and said surface (10a) adjacent to the recess (11) is smaller than a finger thickness. 30

Patentansprüche 35

1. Wäschebehandlungsvorrichtung (100), aufweisend:

- ein Gehäuse (101), das eine Behandlungskammer (102) zur Aufnahme von zu behandelnder Wäsche trägt, wobei das Gehäuse eine Öffnung (101a) zum Gewähren von Zugang zu der Behandlungskammer (102) umfasst; 40
- eine Türanordnung (1), die an dem Gehäuse (101) schwenkbar montiert ist und die Öffnung (101a) öffnen und schließen kann; 45
- eine Verriegelungsvorrichtung (3) zum Verriegeln der Türanordnung in einer geschlossenen Position, in der die Öffnung (101a) geschlossen ist; 50
- wobei die Türanordnung (1) Folgendes aufweist:
 - einen Türrahmen (10), der die Verriegelungsvorrichtung (3) trägt und in dem eine Ausnehmung (11) definiert ist; und 55
 - einen Griff (2), der:

- teilweise in der Ausnehmung (11) aufgenommen ist;
- schwenkbar an dem Türrahmen (10) gehalten ist und eine Drehung (α) zwischen einer Ruheposition, in der der Griff (2) die Verriegelungsvorrichtung (3) betätigt, um die Türanordnung (1) zu verriegeln, und einer Entriegelungsposition, in der der Griff (2) die Verriegelungsvorrichtung (3) betätigt, um die Türanordnung (1) zu entriegeln, ausführen kann;

dadurch gekennzeichnet, dass der Griff (2) ferner Folgendes aufweist:

- einen Griffabschnitt (21), der zu einem Innenbereich (15) der Türanordnung (1) weist; und
- eine Klappe (23) gegenüber dem Griffabschnitt (21), die sowohl in der Ruhe- als auch in der Verriegelungsposition des Griffes (2) eine Oberfläche (10a) des Türrahmens (10) angrenzend an die Ausnehmung (11) überlappt;

wobei die Drehung (α) durch Ziehen des Griffabschnitts (21) weg von der Türanordnung (1) erhalten wird.

2. Wäschebehandlungsvorrichtung (100) nach Anspruch 1, wobei der Türrahmen (10) und die Klappe (23) so geformt sind, dass sowohl in der Ruheposition als auch in der Entriegelungsposition des Griffes (2) ein Spalt zwischen der Oberfläche (10a) und einer Kante (23a) der Klappe (23) definiert ist, wobei der in der Entriegelungsposition definierte Spalt größer als der oder gleich dem in der Ruheposition definierten Spalt ist.
3. Wäschebehandlungsvorrichtung (100) nach Anspruch 1 oder 2, wobei der Griff (2) einen Hauptkörper (20) aufweist, der geeignet ist, zumindest teilweise in der Ausnehmung (11) aufgenommen zu werden, und von welchem die Klappe (23) vorsteht.
4. Wäschebehandlungsvorrichtung (100) nach Anspruch 3, wobei der Griff (2) um einen an dem Türrahmen (10) gehaltenen Stift (5) drehbar ist, wobei der Hauptkörper (20) an dem Stift (5) freitragend gehalten und mit dem Stift (5) durch mindestens einen Verbindungsarm (25) schwenkbar verbunden ist, und wobei mindestens eine Öffnung (14) in der Ausnehmung (11) definiert ist, durch welche der Verbindungsarm (25) hindurchgeht.
5. Wäschebehandlungsvorrichtung (100) nach Anspruch 3 oder 4, wobei ein Hohlraum (24) in dem

Griff definiert ist, wobei der Hohlraum (24) der Klappe (23) gegenüberliegt und den Griffabschnitt (21) aufweist.

6. Wäschebehandlungsvorrichtung (100) nach einem der Ansprüche 3 bis 5, wobei die Drehung (α) durch den Kontakt des Hauptkörpers (20) mit einer Seitenwand (13) der Ausnehmung (11) begrenzt ist. 5
7. Wäschebehandlungsvorrichtung (100) nach einem der vorstehenden Ansprüche, wobei die Verriegelungsvorrichtung einen Riegel (3) aufweist, der geeignet ist, in ein in dem Gehäuse (101) vorgesehenes jeweiliges Loch (30) einzugreifen, wobei der Riegel (3) in der Verriegelungsposition in dem Loch (30) in Eingriff ist und in der Entriegelungsposition außer Eingriff ist. 10
8. Wäschebehandlungsvorrichtung (100) nach Anspruch 7, wobei der Riegel (3) schwenkbar an dem Türrahmen (10) gehalten ist und durch eine Drehung von diesem zwischen der Verriegelungsposition und der Entriegelungsposition geschaltet wird. 15
9. Wäschebehandlungsvorrichtung (100) nach Anspruch 8, wobei der Riegel (3) durch die Drehung (α) des Griffs (2) gedreht wird. 20
10. Wäschebehandlungsvorrichtung (100) nach Anspruch 9, wobei der Griff (2) und der Riegel (3) um eine selbe Achse (A) drehbar sind. 25
11. Wäschebehandlungsvorrichtung (100) nach Anspruch 10, wobei die Achse (A) im Wesentlichen parallel zu einer Drehachse (Z) der Türanordnung (1) relativ zu dem Gehäuse (101) ist. 30
12. Wäschebehandlungsvorrichtung (100) nach einem der Ansprüche 7 bis 11, wobei der Griff (2) durch ein federndes Verbindungsstück (4) mit dem Riegel (3) verbunden ist. 35
13. Wäschebehandlungsvorrichtung (100) nach einem der Ansprüche 7 bis 12, wobei die Verriegelungsvorrichtung ein federndes Element (33) aufweist, das den Riegel (3) in die Verriegelungsposition vorspannt. 40
14. Wäschebehandlungsvorrichtung (100) nach einem der Ansprüche 2 bis 13, wobei die Kante (23a) der Klappe (23) bei der Drehung (α) des Griffs entlang eines Weges wandert, ohne die Oberfläche (10a) des Türrahmens (10), die von der Klappe (23) überlappt ist, zu schneiden. 45
15. Wäschebehandlungsvorrichtung (100) nach einem der Ansprüche 2 bis 14, wobei der Spalt zwischen der Kante (23a) und der Oberfläche (10a) angren- 50

zend an die Ausnehmung (11) kleiner als eine Fingerdicke ist.

5 Revendications

1. Dispositif de traitement de linge (100) comprenant :

- une enceinte (101) supportant une chambre de traitement (102) destinée à recevoir du linge à traiter, ladite enceinte comprenant une ouverture (101a) destinée à donner accès à ladite chambre de traitement (102) ;
- un ensemble de porte (1) monté à pivotement sur ladite enceinte (101) et ayant la capacité d'ouvrir et de fermer ladite ouverture (101a) ;
- un dispositif de verrouillage (3) destiné à verrouiller ledit ensemble de porte dans une position fermée dans laquelle ladite ouverture (101a) est fermée ;
- ledit ensemble de porte (1) comprenant :

- un châssis de porte (10) supportant ledit dispositif de verrouillage (3) et dans lequel est défini un évidement (11) ; et
- une poignée (2) qui est :

- partiellement logée dans ledit évidement (11) ;
- supportée à pivotement sur ledit châssis de porte (10) et capable d'effectuer une rotation (α) entre une position de repos dans laquelle ladite poignée (2) met en oeuvre ledit dispositif de verrouillage (3) de façon à verrouiller l'ensemble de porte (1) et une position de déverrouillage dans laquelle ladite poignée (2) met en oeuvre ledit dispositif de verrouillage (3) de façon à déverrouiller ledit ensemble de porte (1) ;

caractérisé en ce que

ladite poignée (2) comprend en outre :

- une partie de préhension (21) faisant face à une région intérieure (15) dudit ensemble de porte (1) ; et
- une ailette (23) opposée à ladite partie de préhension (21) et chevauchant une surface (10a) dudit châssis de porte (10) adjacente audit évidement (11) à la fois dans la position de repos et dans la position de verrouillage de ladite poignée (2) ;

ladite rotation (α) étant obtenue en tirant ladite partie de préhension (21) dans une direction l'écartant dudit ensemble de porte (1).

2. Dispositif de traitement de linge (100) selon la revendication 1, dans lequel ledit châssis de porte (10) et ladite ailette (23) sont formés de telle sorte qu'un espace entre ladite surface (10a) et un bord (23a) de ladite ailette (23) soit défini à la fois dans ladite position de repos et dans ladite position de déverrouillage de ladite poignée (2), l'espace défini dans ladite position de déverrouillage étant supérieur ou égal à l'espace défini dans ladite position de repos.
3. Dispositif de traitement de linge (100) selon la revendication 1 ou 2, dans lequel ladite poignée (2) comprend un corps principal (20) approprié pour être au moins partiellement logé dans ledit évidement (11) et à partir duquel ladite ailette (23) fait saillie.
4. Dispositif de traitement de linge (100) selon la revendication 3, dans lequel ladite poignée (2) peut être pivotée autour d'une broche (5) supportée sur ledit châssis de porte (10), ledit corps principal (20) étant en porte-à-faux à partir de ladite broche (5) et étant raccordé à pivotement à ladite broche (5) par au moins un bras de raccordement (25) et dans lequel au moins une ouverture (14) est définie dans ledit évidement (11), à travers laquelle passe ledit bras de raccordement (25).
5. Dispositif de traitement de linge (100) selon la revendication 3 ou 4, dans lequel une cavité (24) est définie dans ladite poignée, ladite cavité (24) étant opposée à ladite ailette (23) et comprenant ladite partie de préhension (21).
6. Dispositif de traitement de linge (100) selon l'une quelconque des revendications 3 à 5, dans lequel ladite rotation (α) est limitée par le contact dudit corps principal (20) avec une paroi latérale (13) dudit évidement (11).
7. Dispositif de traitement de linge (100) selon l'une quelconque des revendications précédentes, dans lequel ledit dispositif de verrouillage comprend un élément de verrouillage (3), approprié pour se loger dans un trou respectif (30) prévu dans ladite enceinte (101), l'élément de verrouillage (3) étant logé dans ledit trou (30) dans ladite position de verrouillage et étant sorti dans ladite position de déverrouillage.
8. Dispositif de traitement de linge (100) selon la revendication 7, dans lequel ledit élément de verrouillage (3) est supporté à pivotement sur ledit châssis de porte (10) et est déplacé entre ladite position de verrouillage et ladite position de déverrouillage par une rotation de celui-ci.
9. Dispositif de traitement de linge (100) selon la revendication 8, dans lequel ledit élément de verrouillage (3) est tourné par l'intermédiaire de ladite rotation (α) de ladite poignée (2).
10. Dispositif de traitement de linge (100) selon la revendication 9, dans lequel ladite poignée (2) et ledit élément de verrouillage (3) peuvent être tournés autour d'un même axe (A).
11. Dispositif de traitement de linge (100) selon la revendication 10, dans lequel ledit axe (A) est essentiellement parallèle à un axe de rotation (Z) dudit ensemble de porte (1) par rapport à ladite enceinte (101).
12. Dispositif de traitement de linge (100) selon l'une quelconque des revendications 7 à 11, dans lequel ladite poignée (2) est raccordée audit élément de verrouillage (3) par l'intermédiaire d'un élément de raccordement souple (4).
13. Dispositif de traitement de linge (100) selon l'une quelconque des revendications 7 à 12, dans lequel ledit dispositif de verrouillage comprend un élément souple (33) sollicitant ledit élément de verrouillage (3) dans ladite position de verrouillage.
14. Dispositif de traitement de linge (100) selon l'une quelconque des revendications 2 à 13, dans lequel ledit bord (23a) de ladite ailette (23) se déplace, lors de ladite rotation (α) de ladite poignée, le long d'une trajectoire sans intersecter ladite surface (10a) dudit châssis de porte (10) chevauchée par ladite ailette (23).
15. Dispositif de traitement de linge (100) selon l'une quelconque des revendications 2 à 14, dans lequel ledit espace entre ledit bord (23a) et ladite surface (10a) adjacente à l'évidement (11) est inférieur à une épaisseur de doigt.

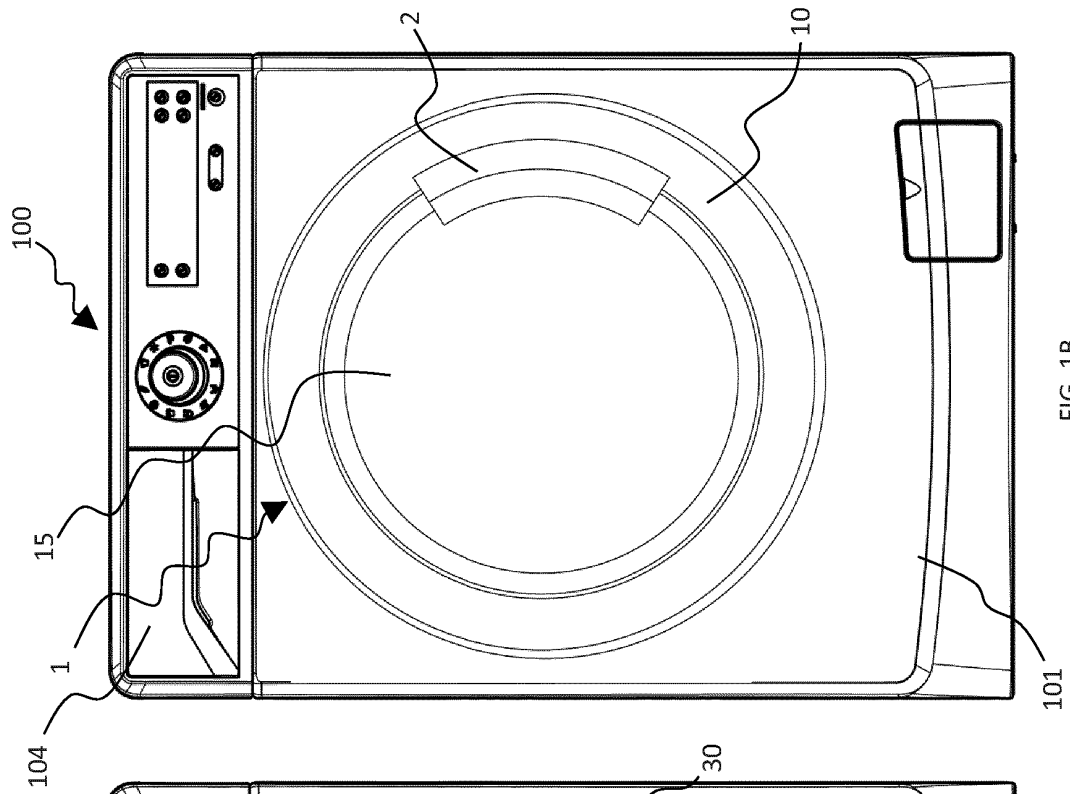


FIG. 1A

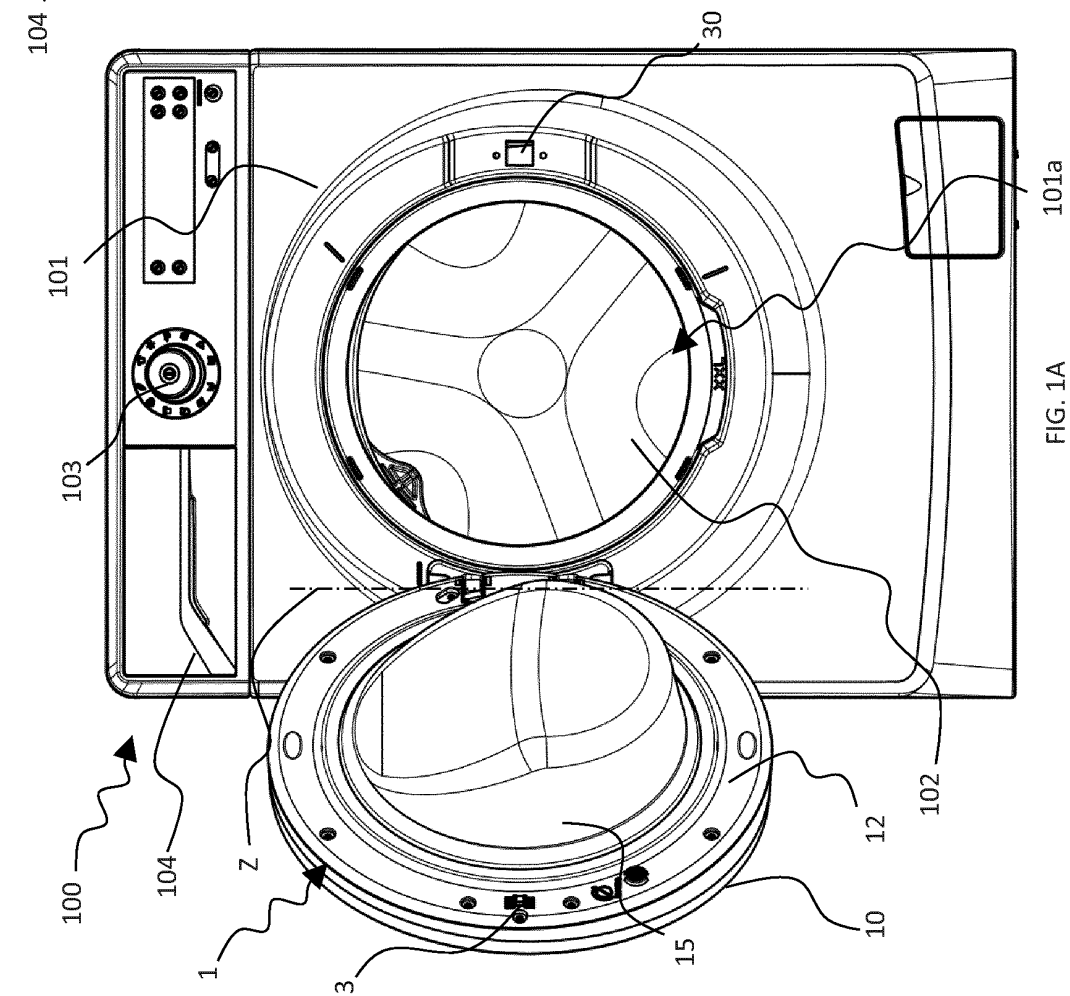


FIG. 1B

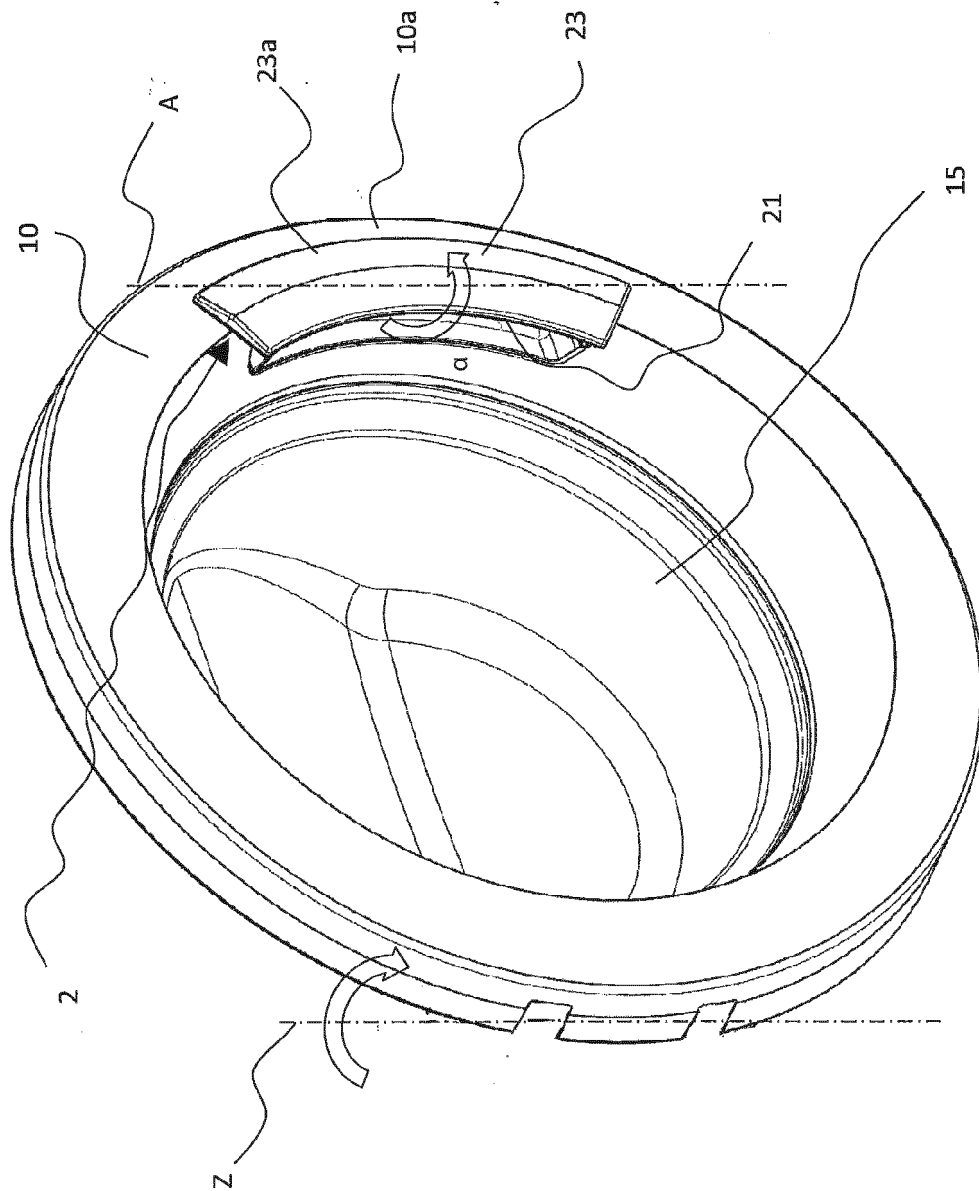


FIG. 2

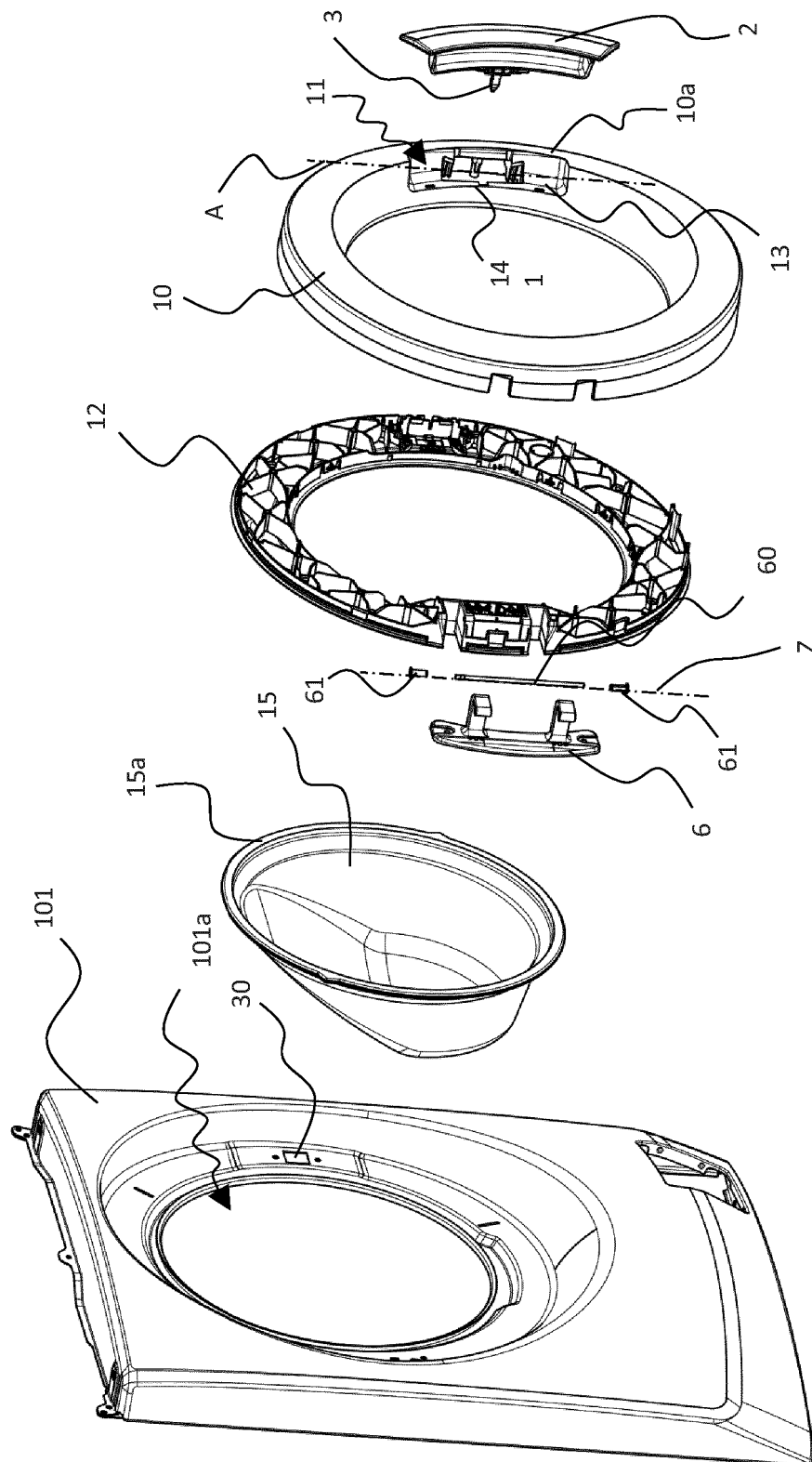


FIG. 3

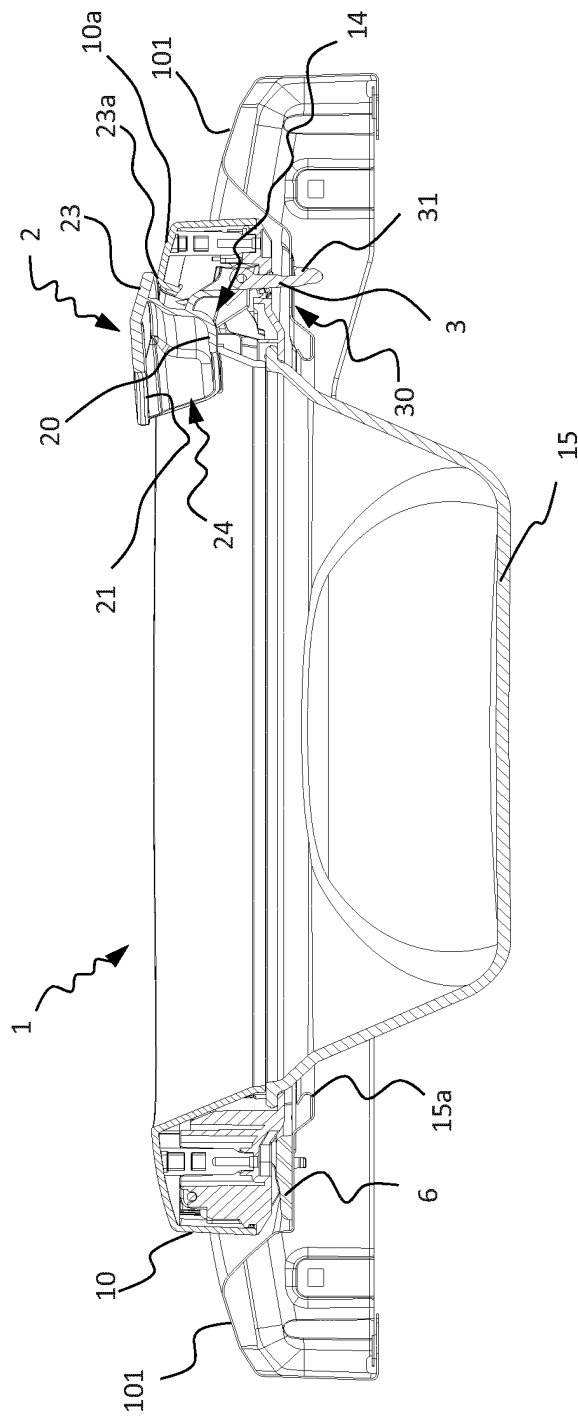


FIG. 4A

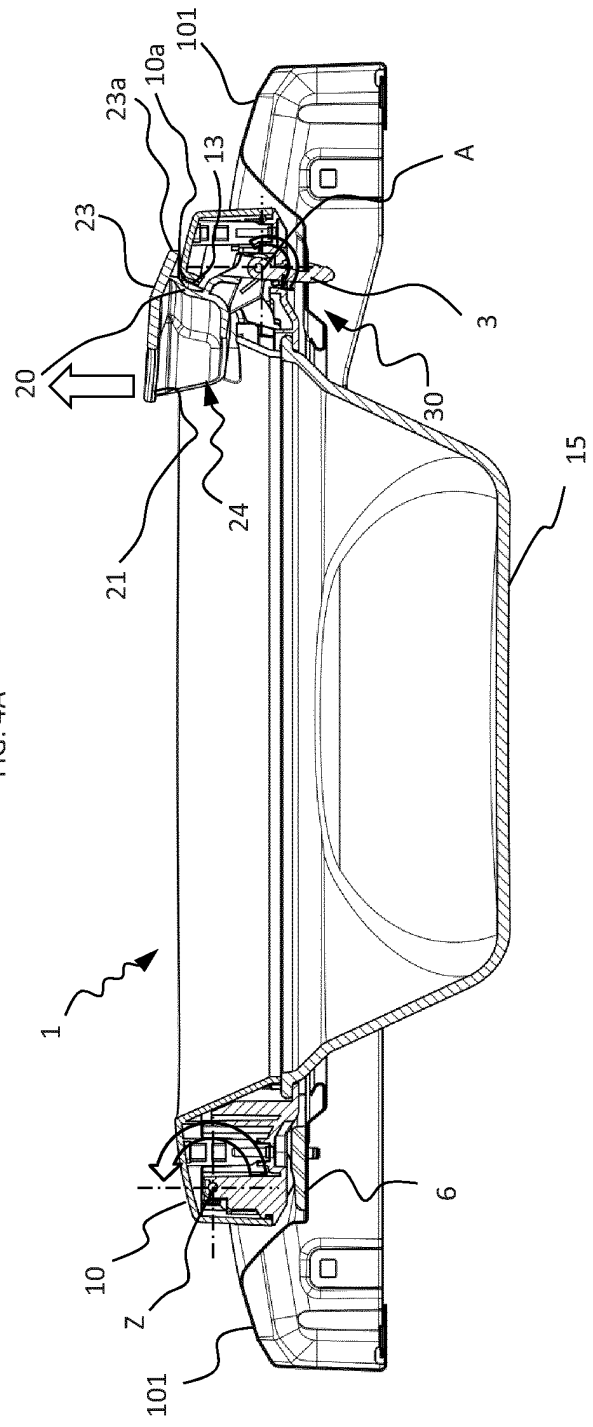


FIG. 4B

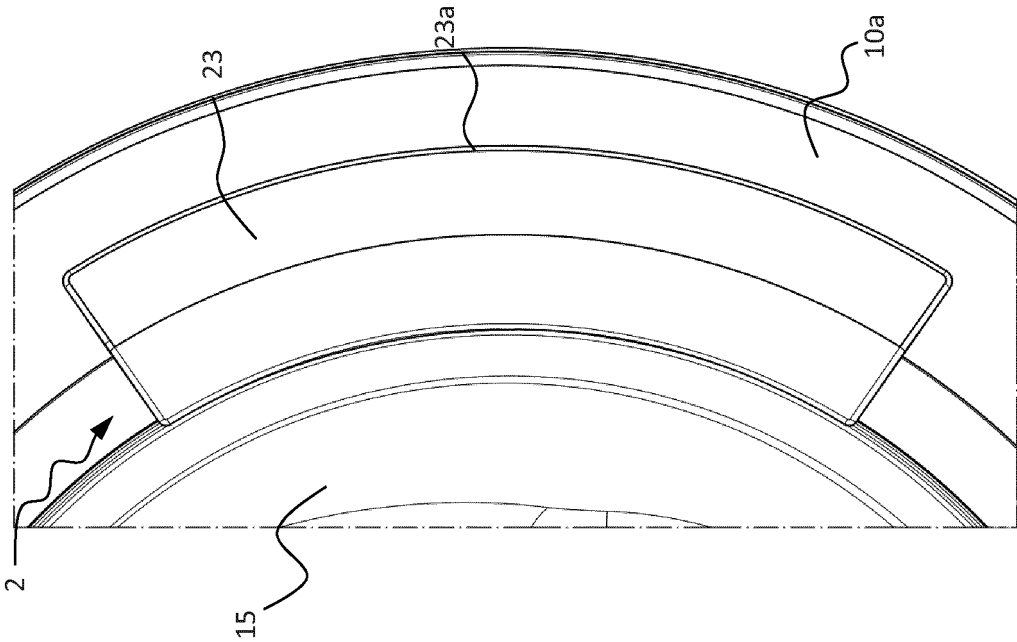


FIG. 5B

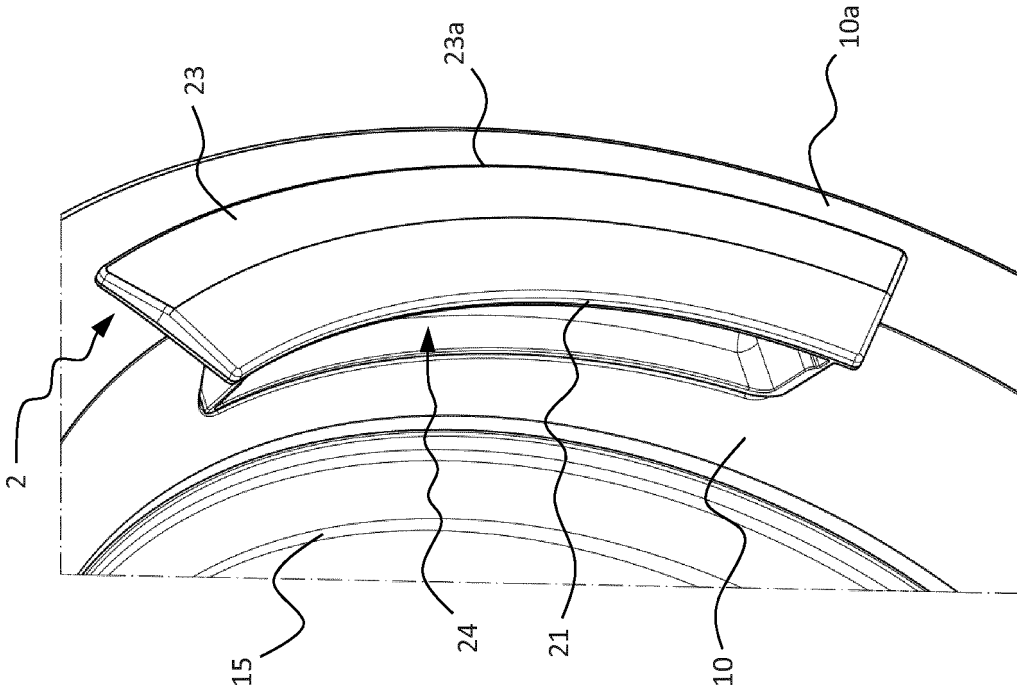


FIG. 5A

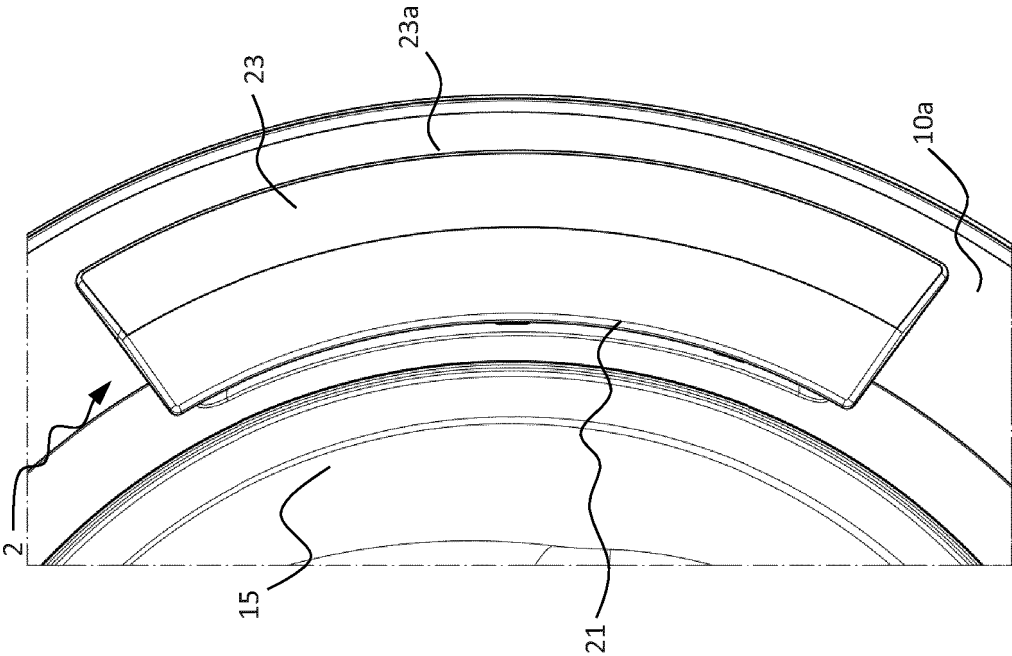


FIG. 6B

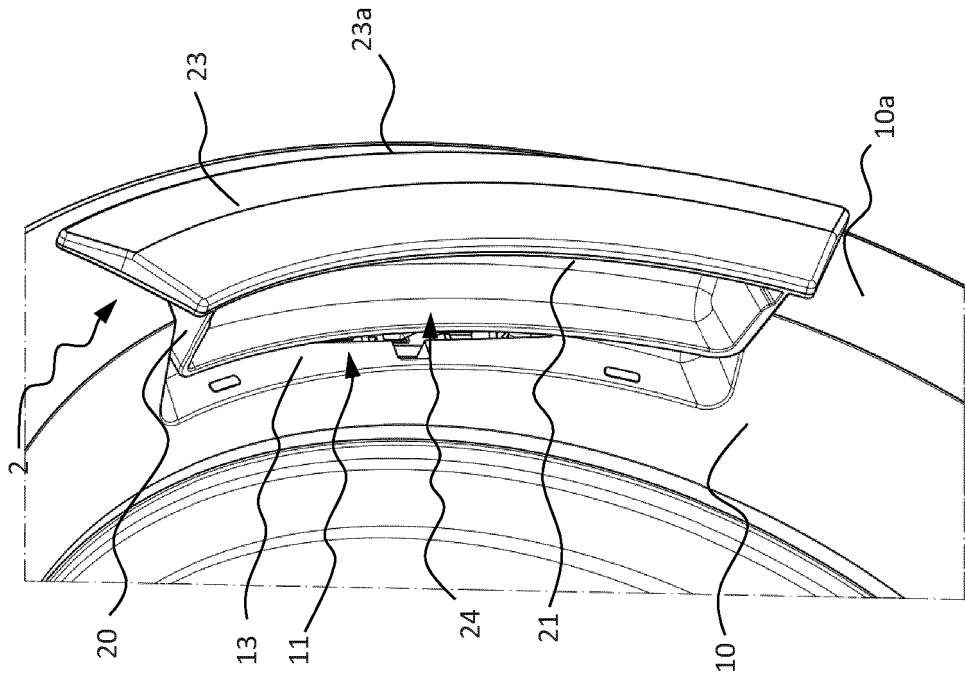


FIG. 6A

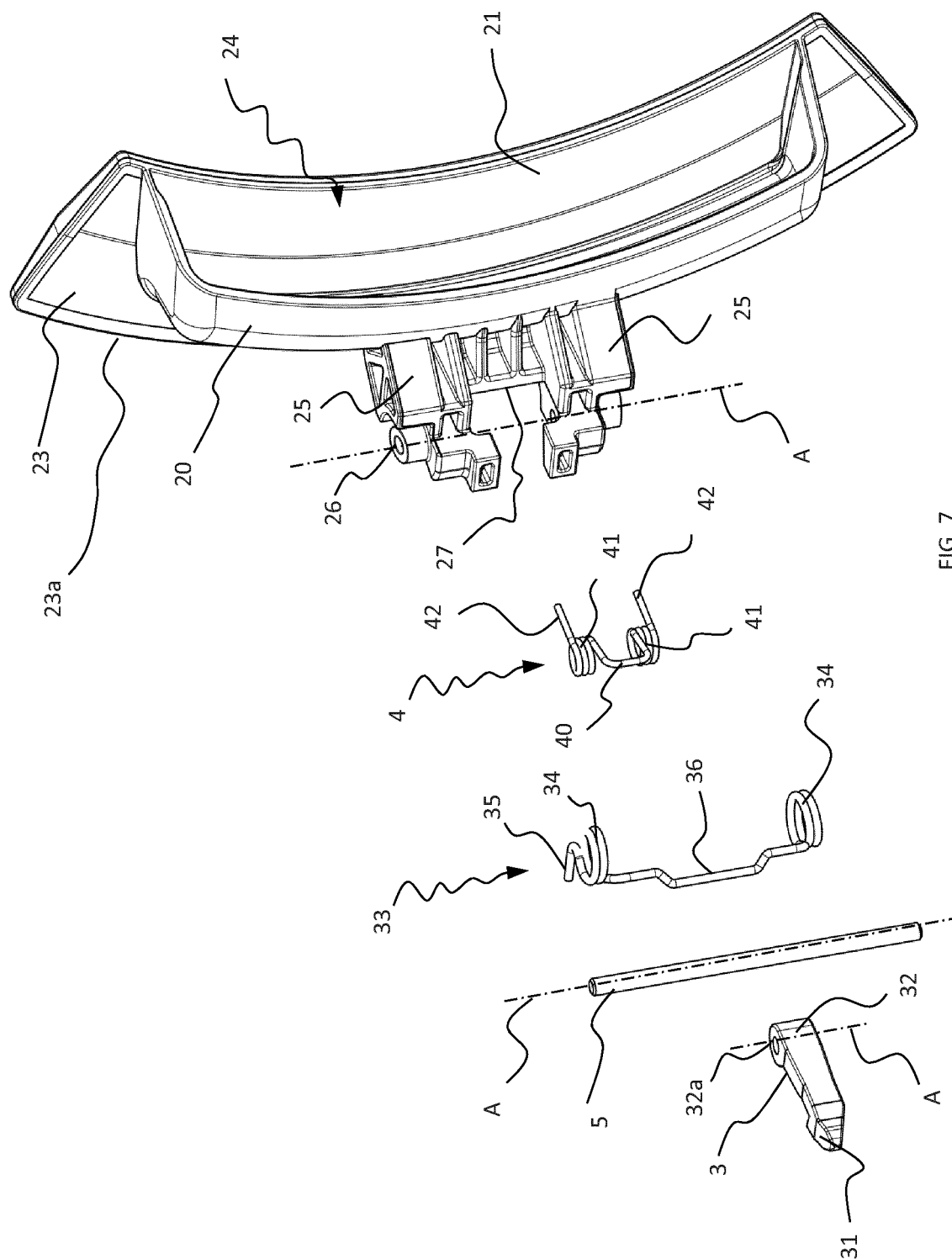


FIG. 7

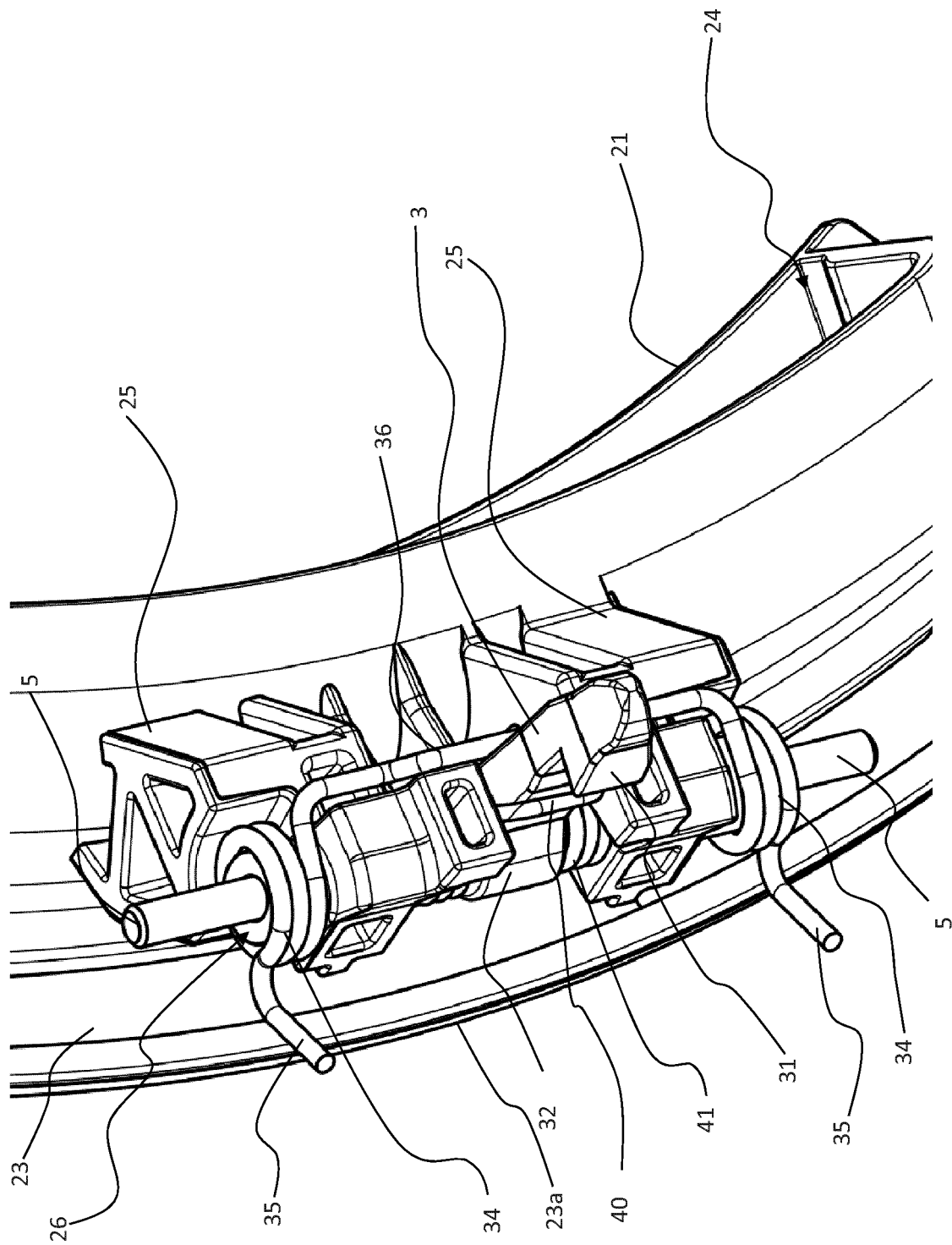


FIG. 8

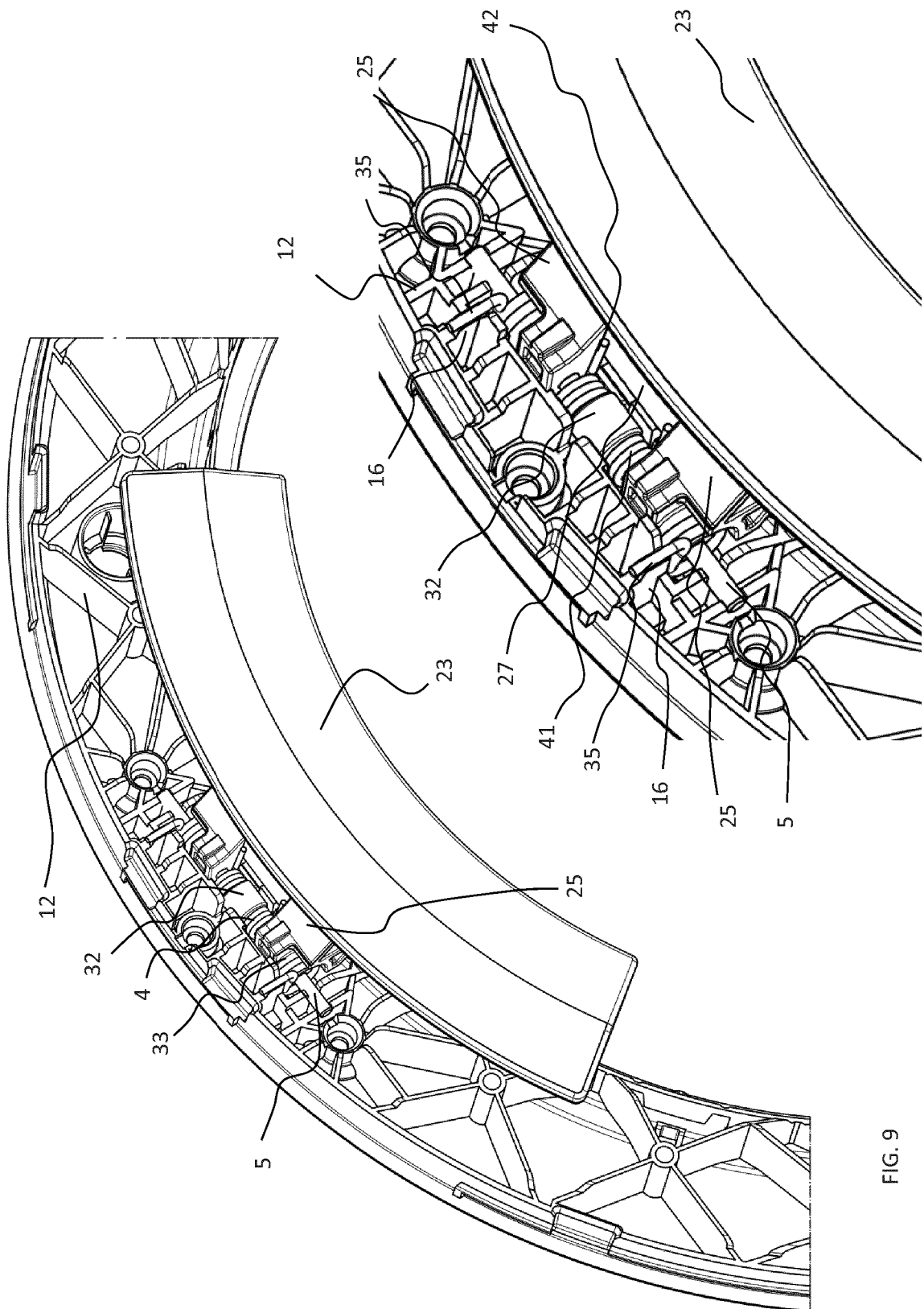


FIG. 9

FIG. 9A

REFERENCES CITED IN THE DESCRIPTION

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